

REMARKS

Claims 1-10 stand rejected in the outstanding Official Action. Claims 1 and 7-10 have been amended and newly written claims 11-13 are offered for consideration. Therefore, claims 1-13 remain in the application.

Attached hereto is a marked-up version of the changes made to the claim(s) by the current amendment. The attached page(s) is captioned "**Version With Markings To Show Changes Made.**"

The Examiner's acknowledgment that the PTO accepts the drawings filed March 26, 2002 is very much appreciated. Likewise, the Examiner's consideration and making of record the prior art submitted in applicants' Information Disclosure Statement is also appreciated.

In section 1 on page 2 of the Official Action, the Examiner confirms applicants' claim for priority. However, the Examiner suggests that "a copy of the certified priority document is not in the Office filewrapper." This is incorrect, as the present application is a national phase entry of PCT Application PCT/GB00/03085, and, as a result, no certified copy of the priority document is required. In fact, WIPO, the PCT processing office, forwards a copy of the priority document and certifies this as a proper copy of the certified priority document, thereby obviating the need for applicants to submit such a document. Moreover, it is noted that the Notification of Missing Requirements mailed May 8, 2002, confirms that the U.S. Patent Office has received the "priority document." As a result, it is submitted that all requirements for priority under §119 and §120 have

been met and acknowledgment of both the claim and constructive receipt of the certified copy is respectfully requested.

Claim 7 stands rejected under 35 USC §112 (second paragraph) as being indefinite. The Examiner's objection to this claim language is well taken and applicants have amended the claim to recite in more appropriate form the various alternative structures encompassed by the claim. Amended claim 7 is believed to meet the requirements of 35 USC §112 and any further rejection objection thereto is respectfully traversed.

Claim 1 stands rejected under 35 USC §102 as anticipated by Sony (JP 08-043759). Applicants have amended claim 1 to encompass the structure disclosed in Figure 4 of applicants' specification, i.e. where objects to be imaged are spaced at least some varying distance from the optical system which includes the diffraction grating. While these objects may also be transversely spaced, the claim specifically recites that they are at least partially spaced along the optical axis. There is no disclosure in the Sony patent or in the machine translation thereof which discusses the imaging of multiple objects, especially where those multiple objects are differing distances from the diffraction grating, whether or not they are on the optical axis.

Applicants' independent claim 1 also clarifies that the images from these varyingly spaced objects are focused on detectors which are at least transversely spaced with respect to an optical axis between the optical system and the detectors. While the

detectors may also be spaced at varying distances from the optical system, they are at least transversely spaced in accordance with the claim.

While the Sony disclosure at Figure 4 referred to by the Examiner arguably shows some transversal spacing, it appears to show point source light through the diffraction grating being focused on individual detectors. In other words, a single image or light is broken up by its color and focused on the red, green and blue detectors in the Sony device. The Sony device is clearly not directed towards an apparatus for producing a plurality of images from a plurality of objects varyingly spaced from the optical system. Accordingly, claim 1 as amended clearly distinguishes over the Sony patent, as it is directed towards a color camera, rather than the apparatus claimed in applicants' claims.

Claims 1, 2 and 6-10 stand rejected under 35 USC §102 as anticipated by Maeda (U.S. Patent 5,115,423). A review of Maeda, and specifically Figure 8 and the associated text in column 8 referred to by the Examiner, discloses an optical system for reading an optical disk. A laser 21 generates a laser beam which is transmitted through a diffraction grating system 40 to the optoelectronic disk and the light is then reflected back and focused into detector 46. As noted above, there is no disclosure of a plurality of objects having varying distances from the optical system which are imaged by the apparatus. Absent a structure or combination of structures for imaging a plurality of objects having varying distances from an optical system, Maeda is no more pertinent to the presently

claimed invention than is the Sony reference. Any further rejection of claims 1, 2 and 6-10 thereover is respectfully traversed.

Claims 1-5 and 7 stand rejected under 35 USC §102 as being anticipated by Lee (U.S. Patent 6,043,935). The Examiner's apparently understanding of the Lee reference is questioned. As disclosed in the Abstract, Lee is a system for providing a compact DVD optical pick-up using different frequency laser beams to read a CD. While the Examiner suggests that item 430 in the reference to Figure 4 is a "diffraction grating (430)," in fact a reference to column 4, line 67, indicates that this in fact is "a hologram 430." The Examiner also identifies "ancillary optical modules (416) and (426)" but the Lee reference at columns 4 and 5 identify these structures as "hologram device 416" (column 4, line 66) and "hologram device 426" (column 5, lines 9 and 10).

The Lee reference is concerned with a DVD optical pick-up and a CD optical pick-up and hence uses the two different frequencies in order to provide different focal lengths depending upon the disk which is being used, i.e. 460 or 462. The Examiner should appreciate that both systems 410 and 420 are not and cannot be used simultaneously. One system is used with CDs and the other system is used with DVDs. Thus, Lee specifically teaches at any one point in time, a single laser operating through a single ancillary module through a single diffraction grating and then processing the light reflected from a DVD or a CD back through those items to a single photodetector.

Applicants' amended claim 1 recites an apparatus for focusing images from a plurality of object planes and includes an optical system for producing a plurality of diffraction orders and a plurality of ancillary optical modules for focusing the diffraction orders on corresponding transversely separated detectors. In Lee, there are no plurality of detectors as it is used and the two different detectors in Lee are not used simultaneously, they are used at different points in time depending upon whether the device is being used as a DVD reader or a CD reader.

Basically the Examiner is arguing that two separate systems disclosed and taught by the Lee reference, but superimposed one upon the other as shown in Figure 4, meet applicants' system which requires images focused from a plurality of object planes being focused onto a plurality of detectors. Lee simply doesn't disclose the structure recited and claimed in applicants' independent claim or claims dependent thereon. Therefore, any further rejection thereunder is respectfully traversed.

Applicants have also added newly written claims 11-13, with claim 11 limiting claim 1 to the situation in which the two optical axes are coincident, claim 12 where the diffraction grating includes grating lines and claim 13 where the grating lines are non-plane parallel. Consideration of these newly written claims is respectfully requested.

Having responded to all objections and rejections set forth in the outstanding Official Action, it is submitted that claims 1-13 are in condition for allowance and notice to that effect is respectfully solicited. In the event the Examiner is of the opinion that a

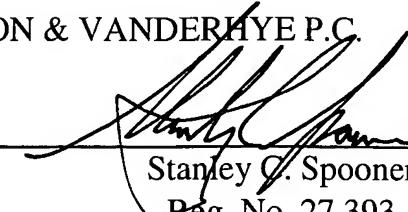
GREENAWAY et al
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brief telephone or personal interview will facilitate allowance of one or more of the above claims, he is respectfully requested to contact applicant's undersigned representative.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS

1. (*Currently Amended*) An apparatus for focussing images[producing simultaneously] from a plurality of object planes, said object planes at least partially separated along a first optical axis, onto a plurality of detectors, said detectors at least partially [spatially] separated transversely with respect to a second optical axis, said apparatus [images] comprising:

an optical system [(1) arranged to produce an image associated with a first optical transfer function;] including a diffraction grating [(4) arranged to produce, in concert with the optical system, images associated with each] for acting upon incident light from said plurality of object planes to produce a plurality of diffraction orders of light; and a plurality of ancillary optical modules[(5, 6, 7) operating on individual diffraction orders and

means for detecting the images, wherein the optical system (1) and diffraction grating (4) are located on an optical axis the diffraction grating (4) is located in a suitable grating plane and the ancillary optical modules (5, 6, 7) modify the optical transfer functions associated with the images characterised in that the optical system (1) and diffraction grating (4) are arranged such that a plurality of object planes (9, 10, 11) are imaged and each image associated with a diffraction order corresponds to a different object plane] , each module focussing one of said plurality of diffraction orders of light on a corresponding one of said plurality of transversely separated detectors.

7. (*Currently Amended*) An apparatus according to claim 1 whereby the diffraction grating is [any one of] comprised of an amplitude-only diffraction grating, a phase only diffraction grating [or] and a phase and amplitude diffraction grating and [any] said grating is one of a reflective [or] and a transmissive grating[and any of these in which the grating lines are not plane parallel].

8. (*Currently Amended*) An apparatus according to claim 1 whereby the grating is one of a two-level (binary), a multi-level (digitised) [or] and a continuous-level (analogue) structure.

9. (*Currently Amended*) The apparatus of claim 1 where each object plane contains an array of elements, capable of existing in at least two states and in which the detector [means (12, 13, 14)] is capable of distinguishing between said states.

10. (*Currently Amended*) An apparatus for reading data from a three dimensional optical storage medium wherein object planes are located within the medium comprising an apparatus according to claim 9 wherein the [detecting means (12, 13, 14)] detector is adapted to produce a signal dependent on the state of the elements.

-- 11. (*New*) An apparatus according to claim 1, wherein said first and second optical axes are coincident.

12. (*New*) An apparatus according to claim 1, wherein said diffraction grating includes grating lines.

13. (*New*) An apparatus according to claim 12, wherein the grating lines are not plane parallel.--